Ricoh Printer Configuration on the

Common UNIX Printing System

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1. Introduction

Although UNIX has been around for many years its printing system has not changed very much. Most UNIX printing systems are still based on the Line Print Daemon Protocol (LPD) for remote printing. This protocol is widely accepted due to its simplicity and ease of implementation, but with the advancement in printing technology it has reached its limits and cannot support more sophisticated requirements such as security and access control.

The Common UNIX Printing System (CUPS) was developed to answer this limitation and to provide a common platform for printing. The Internet Printing Protocol (IPP), the protocol on which CUPS is based, allows for more interaction between hosts, print servers and print devices by utilizing the Hypertext Transfer Protocol (HTTP) as a means of communication. With this setup, a growing number of features can be easily implemented by defining new sets of operations. With the IPP protocol, jobs can be sent locally or remotely over the Internet regardless of the location so long as it is accessible through HTTP.

CUPS is a robust in printing system loaded with great features. These include printer classes, access control, built-in backend modules, web-based configuration and Application Programming Interface (API).

Printer classes provide the ability to group printers such that jobs sent to a class are forwarded to the first available member of that class. This improves the availability of printer resources and avoids downtime if one of the printers is unavailable or goes offline.

To maintain compatibility with both System V and Berkeley style of printing, CUPS provides support for both **lp** and **lpr** print commands in addition to the other utilities. It also includes limited support for LPD client by providing its own LPD daemon.

This paper illustrates how to configure a Ricoh printer or multifunction device (MFD) on CUPS. The installation process only covers driver setup on devices with the Postscript option enabled. To learn more on how to setup non-Postscript devices, refer to the CUPS documentations listed in the **References** section.

Several installation procedures using different tools are covered in this paper using both screenshots and command line interface to describe the process. Linux is used as the operating system in this paper. If another UNIX-flavored platform is used, the same procedures should apply so long as the same tool exists on that platform.

This paper does not cover the implementation of CUPS and its Application Programming Interface (API). The CUPS book by Michael Sweet, listed in the **References** section, is recommended to readers interested in this area.

2. Hardware/Software Requirements

2.1. Workstation Operating System:

A Linux or UNIX workstation and a Windows XP or 2000 workstation attached to a suitable network. Software supporting FTP or SAMBA is also desirable.

2.2. Applicable Products:

This document is applicable to all printers, copiers and multifunction devices (MFPs) equipped with the PostScript option.

For affected models, please refer to the following table.

Product Code	Ricoh Corp Model Name	Savin (USA) Model Name	Gestetner Model Name	Lanier Model Name
B045/B044/B046	Aficio 120/1013/1013F	2512/2513/2513f	1202/1302/1302f	5612/5613/5613F
B001/A250	Aficio 150/180*	2015DP/9918DP	3215s/3218	5218
B039/B040/B043	Aficio 1015/1018/1018D	2515/2518/2518d	1502/1802/1802d	5515/5518
B043/B027	Aficio 1022/1027	2518d/2527	1802d/2712	5618/5627
B003/B004	Aficio 1035/1035G/1045/1045G	2535/2235/2545/2245	3502/4502	5635/5645
B098	Aficio 1055	2555	5502	LD055
B064/B065	Aficio 1060/1075	2560/2575	6002/7502	LD060/LD075
A294 II/A295 II	Aficio 1085/1105 Type850 Aficio 1085/1105 EB-105(e)	2585/25105	8502/10502	5685/5705
B051	Aficio 1224C/1224CG	C2408	DSc224	LD024C
B052	Aficio 1232C/1232CG	C3210	DSc232	LD032C
B129	Aficio 1515**	3515	DSm415	LD015
B130	Aficio 1515F*	3515F	DSm415f	LD015f
B168/B169	Aficio 1515MF/1515PS	3515MF	DSm415pf	LD015spf/ LD015sp
A265/A267	Aficio 220/270*	9922DP/9927DP	3222/3227	5222/5227
B121	Aficio 2015***	4015	DSM615	LD115
B122	Aficio 2018***	4018	DSM618	LD118
B123	Aficio 2018D***	4018D	DSM618d	LD118D
B089	Aficio 2022***	4022	DSm622	LD122
B093	Aficio 2027***	4027	DSm627	LD127
B079	Aficio 2035	4035	3532	LD035
B135	Aficio 2035e/2035eG***	4035e/4135eG	DSM635/ DSM635g	LD135
B082	Aficio 2045	4045	4532	LD045
B138	Aficio 2045e/2045eG***	4045e/4145eG	DSM645/DSM645g	LD145
B070	Aficio 2090**	4090	9002	LD090
B071	Aficio 2105**	10512	4105	LD0105
B070/B071	Aficio 2090/2105 EB-105EX**	4090/4105	9002/10512	LD0105/LD035
B190	Aficio 2228c	C2820	DSc328	LD228c
B146/B147	Aficio 2232c***	C3224	DSc332	LD232c
B148/B149	Aficio 2238c***	C3828	DSc338	LD238c

Product Code	Ricoh Corp Model Name	Savin (USA) Model Name	Gestetner Model Name	Lanier Model Name
	Aficio 3006 RC-200*			
	Aficio 3006 E-300*			
A230/A231/A231b/A232/A232b	Aficio 340/350/355/450/455*	9935D/9935DP/2035DP/9945DP/2045DP	3235S/3235/3245	5235/5245
A283/A231b/A284/A232b	Aficio 350e/355e/450e/455e*	9935DPE/2035DP/9945DPE/2045DP	3235e/3245e/3245	5435/5235/5445/5245
B018	Aficio 3506 RC-210* Aficio 3506 E-310*	SDC326	CS225	5625
A259/A260	Aficio 4006/4106 RC-200* Aficio 4006/4106 E-300*	SDC306A/SDC306E	CS206D/CS206DE	5806/5806E
B017	Aficio 4506 RC-210* Aficio 4506 E-310*	SDC326A	CS231	5631
A229L/A229	Aficio 550/650*	9955DP/9965DP	3325/3265	5255/5265
A292/A293	Aficio 551/700 Type700* Aficio 551/700 EB-70	2055DP/2070DP	3355/3370	5455/5470
A257/A269	Aficio 6010/6110 E-650*	SDC410/SDC410E	CS210/CS210E	5710/5710E
B023	Aficio 6513 E-710* Aficio 6513 E-810* Aficio 6513 E-820*	SDC413	CS213D	5813
A294/A295	Aficio 850/1050 Type850 Aficio 850/1050 EB-105(e)	2085DP/2105DP	3285/32105	5485/5505
G032	AP1400*	SLP14	P7014	
G054	AP1600	SLP16	P7016	
G031	AP2000*	SLP20	P7020	
G033	AP204*	SLP416c	C7004	
G063	AP206 *	SLP6C	C7006	AP206
G049	AP2100*	SLP21	P7021	
G056	AP2600/AP2600N*	SLP26	P7026	
G074/G073	AP2610/AP2610N	MLP26/MLP26N	P7126/P7126N	AP2610/AP2610N
G038	AP2700 *	SLP27	P7027	2027
G024	AP305*	SLP517c	C7005p	
G047/G048	AP306/AP306D *	SLP624S/SLP624D	C7006W/C7006DW	
G062	AP3200	SLP32	P7032	AP3200
G060	AP3800C	SLP38C	DSc38	2138
G082	AP3850C	SLP38C	DSc38F	2138E
G095	AP400N***	P7325N		LP026N
G035	AP4500*	SLP45	P7045	2045
G065	AP4510	MLP45	P7145	2145AG/2145AH
	AP505*			
G091	AP600N***	P7132N		LP032
G108	CL1000N**	CLP831	P7431cn	LP031c
G121	CL2000**			LP116c
G122	CL2000N**	CLP17	C7416	LP116cn
G081	CL3000	CLP1620	C7116	LP020C
G120	CL3000e**	CLP18	C7417	LP122c
G071	CL5000	CLP1036	C7010	LP036C
G080	CL7000	CLP28	DSc38U	LP138C

Product Code	Ricoh Corp Model Name	Savin (USA) Model Name	Gestetner Model Name	Lanier Model Name
	CL7100***			

* These models support PS (file format) only. PostScript is required for printing.

** These models support RedHat 9.x, Enterprise, IBM AIX 5L V5.2, and HP-UX11i. RedHat Enterprise user must disable CUPS and install LPR.

*** These models support Red Hat Linux 9.x and IBM AIX 5L V5.2. All other models support up to Red Hat Linux 8.x. and IBM AIX 5L V5.1.

2.3. Hardware Requirements:

A Linux or UNIX Workstation and a Windows Workstation PC, a printer or multifunction device with Post Script capability connected to your network.

2.4. Who Should Read this Document?

This paper assumes basic knowledge of UNIX or Linux and network printing. The reader should be familiar with the Linux desktop environment as well as basic UNIX commands in order to perform the command line instructions. Knowledge of one of the file transfer protocols such as FTP or SAMBA is also required to do network file transfers between Windows and Linux operating systems unless the preferred method of file transfer is storage media such as floppy disk or CD ROM.

2.5. Other Requirements:

N/A

3. Setup and Configuration

This section illustrates the different methods for installing printer drivers using a Postscript Printer Definition (PPD) file. This is intended for Postscript-enabled devices only. Several options are available for driver installation as described in the sections that follow.

The procedure starts by downloading the PPD file and installing it in the proper directory. Once the PPD file is available, any of the methods described below can be used to proceed with the rest of the installation.

3.1. PPD File Setup:

1. Since PPD files are not currently available as separate downloads, download the Windows Postscript driver and obtain the PPD files from the installer files. Using a Windows based PC, go to http://www.ricoh-usa.com/downloads and download the appropriate Windows 2000/XP Postscript driver for the device you intend to install.
2. Run the installer and extract it to a temporary folder.
3. Open the PPD file using a text editor such as Notepad and determine which PPD file is the right one for the device you are installing as shown in Figure 1. Change the filename extension to lowercase - *.ppd and make sure that it has read access permission for all users. A useful option is to rename the file(s) to the device you are installing (e.g., aficioAP3800C.ppd).

```
*PPD-Adobe: "4.3"
*%
*%  Printer Description file
*%    for "RICOH Aficio AP3800C PS"
*%
*%    CreationDate: 2000/07/12
*%    Modified:     2002/11/21
*%
*%    COPYRIGHT (C) 2000-2002 RICOH COMPANY, LTD.
*%    All rights reserved.
*%

*FileVersion: "2.1"
*FormatVersion: "4.3"
*LanguageEncoding: ISOLatin1
*LanguageVersion: English
*ModelName: "RICOH Aficio AP3800C"
*PCFileName: "RICL8003.PPD"
*Manufacturer: "RICOH"
*Product: "(RICOH Aficio AP3800C PS3)"
*PSVersion: "(3011.103) 2"
*ShortNickName: "RICOH Aficio AP3800C PS"
*NickName: "RICOH Aficio AP3800C PS"
.
.
.
```

Figure 1: PPD File Opened in Notepad.

4. Transfer the PPD file from the Windows PC to the Linux machine either by using network file transfer protocols such as FTP or SAMBA, or by copying it to a floppy disk or CD ROM. If disk capacity is an issue, use **gzip** or some other appropriate zip utility to compress the PPD file.

5. On Linux PC, login as **root**. Copy the PPD file to **/usr/share/cups/model or /usr/share/cups/<vendor name>**

6. Restart the CUPS daemon using: **# /etc/init.d/cups restart** as shown below:

Figure 2: Restart CUPS Daemon Command

Or, by using this command if the CUPS daemon is running as root: ***# kill –HUP <cups process id***

NOTE
This second method, using the kill command, works only if CUPS daemon is running as root.

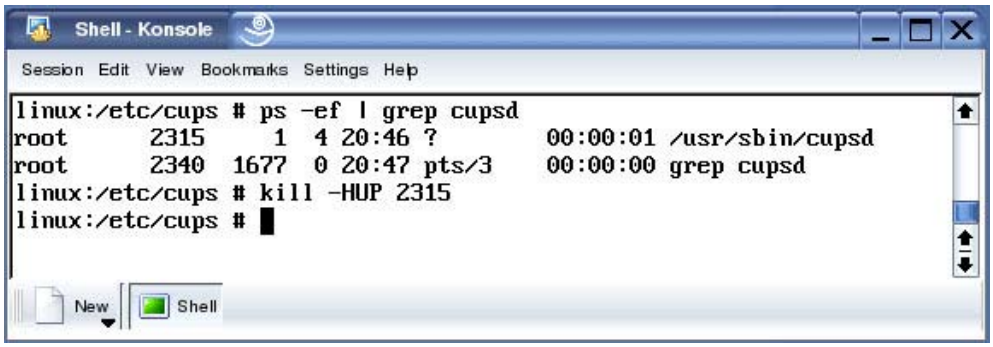

Figure 3:Restarting the CUPS Daemon by Using the Kill Command

7. Verify that the PPD is successfully installed by running this command: # **lpinfo -m | grep <ppd model>** This command displays all installed PPDs matching the provided ppd model. This will show the PPD and model name if it is installed correctly.

Figure 4: Verifying that the PPD is Successfully Installed

3.2. Installing the Driver:

The driver can be installed using several methods:

1. To install using **Suse Linux yast2** admin tool, refer to **Section 3.2.1 - Suse yast2.**
2. To install using **KDE** tools, refer to **Section 3.2.2 - KDE Print Manager**.
3. To install using **Web UI**, refer to **Section 3.2.3 – Web Interface**.
4. To install using the command line tool, refer to **Section 3.2.4 – Command Line Interface.**

NOTE
"**root**" login is required to perform the procedures described in the following sections. The screenshots below were taken from Linux PCs running Suse Professional V9.0 and Redhat 9.0. All methods discussed below except section 3.2.1 are applicable to all Linux versions .

3.2.1. Suse Yast2:

1. To display the **Yast2 Printer Configuration** window, type the following on the command line: # **yast2 printer & <enter>.** The **Printer setup: Autodetected printers** window shown in Figure 5, below, will open.

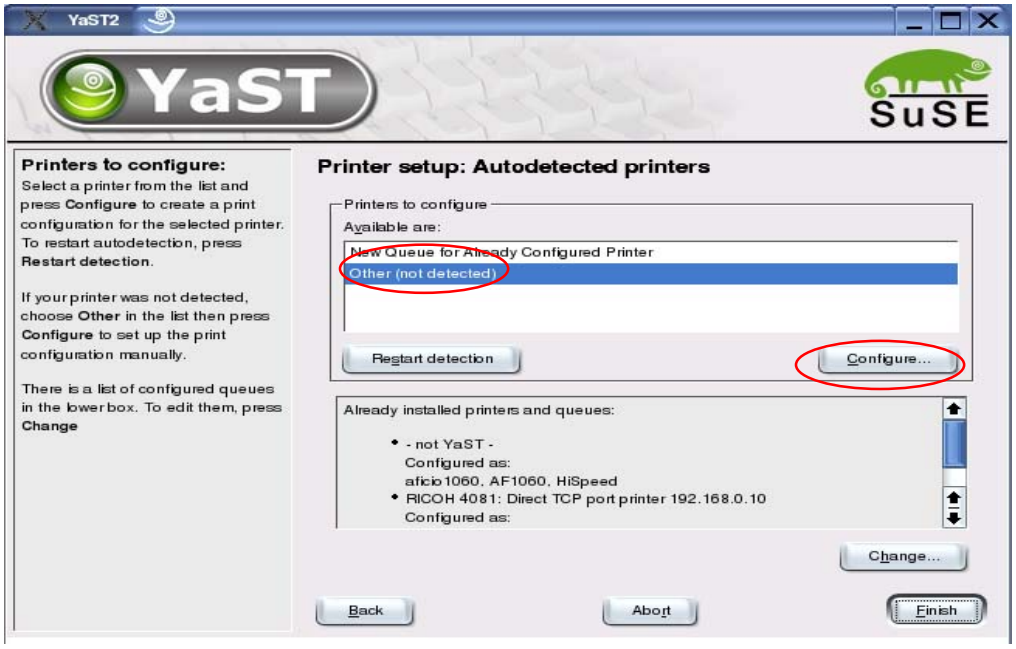

*Figure 5: **Yast2 Printer Configuration** Window*

From the **Printers to configure** list, select **Other (not detected)** and click on the **Configure** button to continue.

2. Select the backend or the method used to communicate with the printer from the **Printer Type** window. In the example shown in the following figure, **Print Directly to a Network Printer** is selected in the **Select Your Printer Type** list.

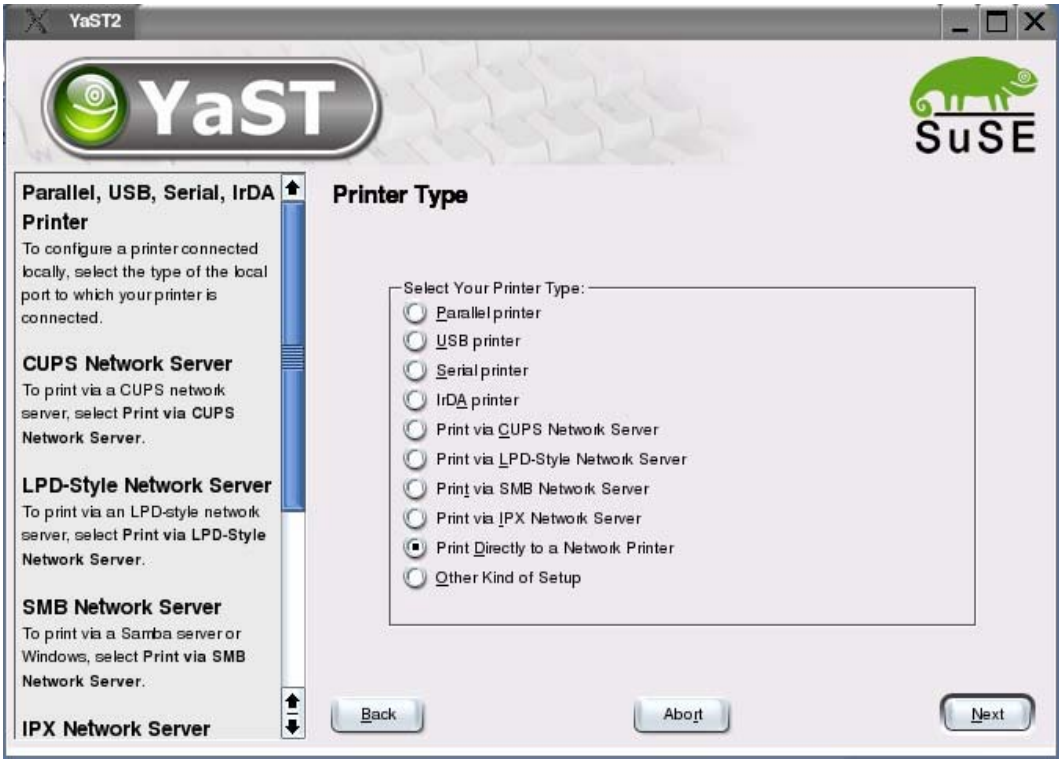

*Figure 6: **Printer Type** Window*

Click the **Next** button to continue

3. Select the type of network printing protocol from the **Select Your Printer Type** field in Figure 7.

NOTE
All three protocols listed in the Figure 7 should be supported by most Ricoh printers or MFDs. Two protocols, **Direct TCP Port Printing** and **Remote LPD Queue**, are generally used.

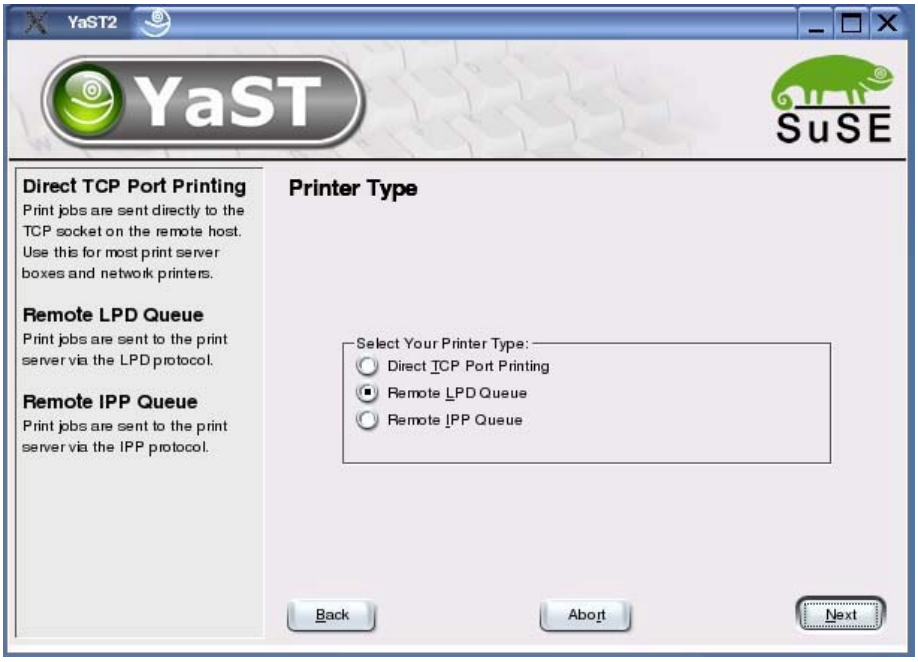

*Figure 7: **Network Printing Protocols** Window*

Click the **Next** button to continue.

4. Figure 8 will require the printer's IP address and the remote queue name which is generally **lp**. When you enter those parameters, click on the **Next** button to continue.

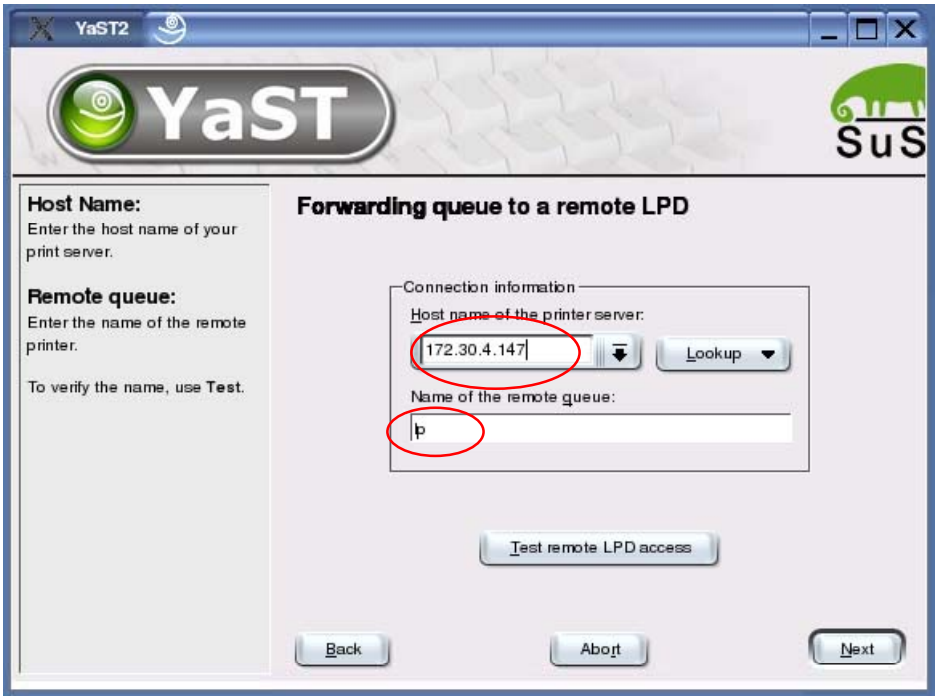

*Figure 8: **Forwarding Queue to a Remote LPD** Window*

5. Enter the printer name in the **Name for Printing** field and the optional **Description of Printer** and **Location of Printer**. Enable **Local Filtering** by clicking in the check box.

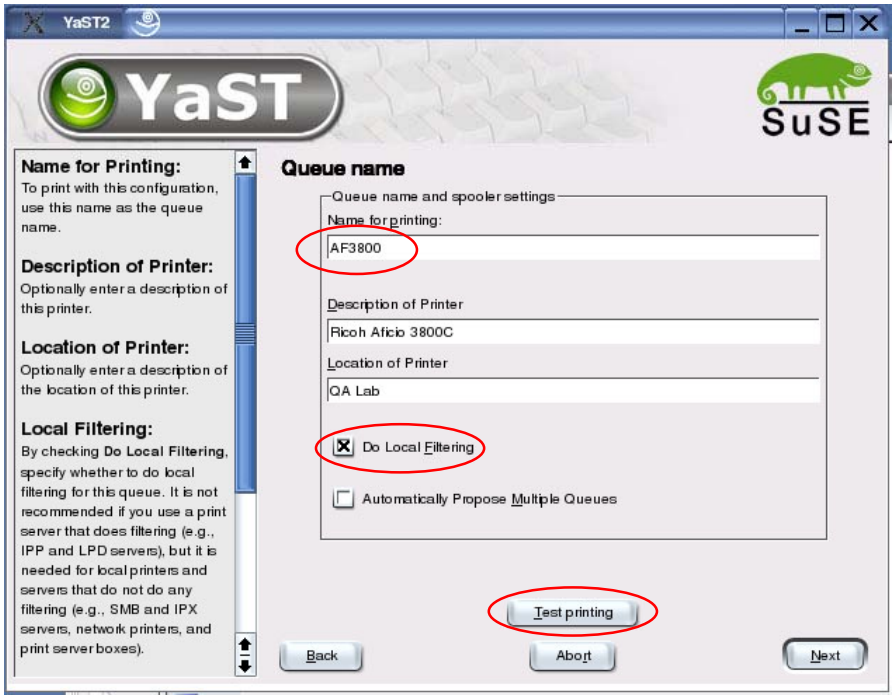

*Figure 9: **Queue Name** Window*

Verify printing to the device is available by clicking on the **Test printing** button. Click on the **Next** button to continue.

6. Select the manufacturer and the model of the printer from the list. Click on the **Next** button to continue.

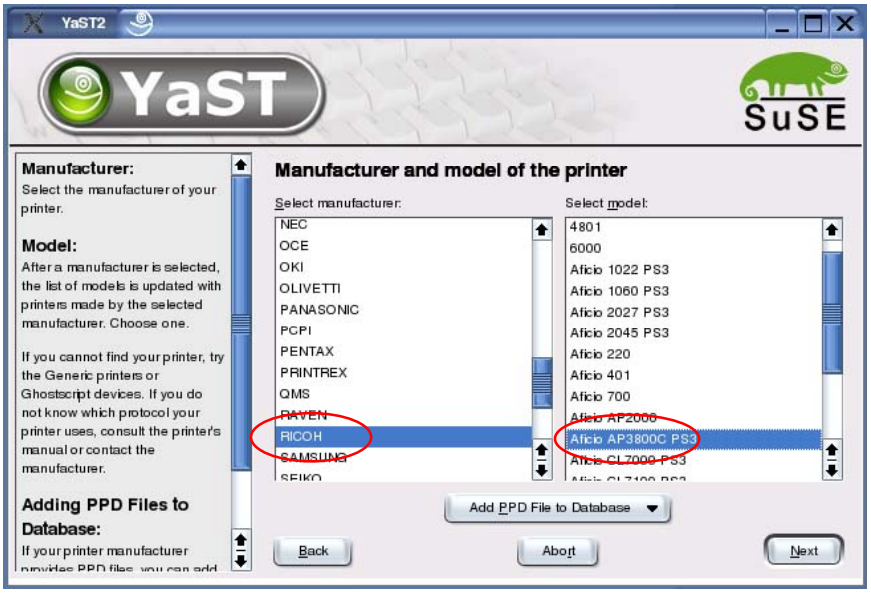

*Figure 10: **Manufacturer and Model of the Printer** Window*

7. Modify the default driver settings by selecting **Printer Filter Settings** from the list box and then clicking on the **Edit** button.

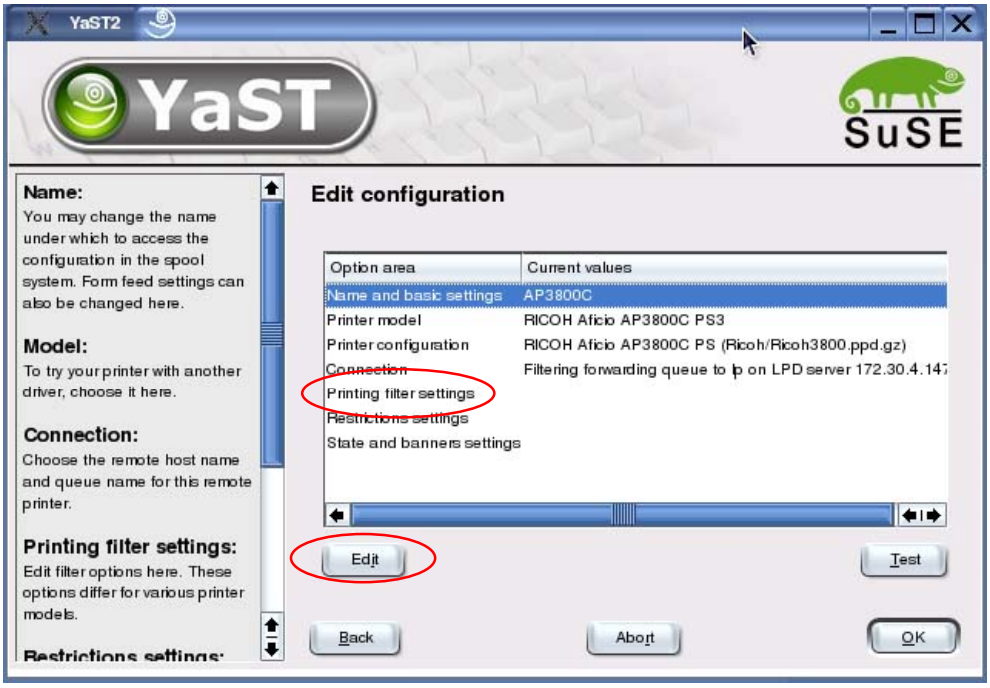

*Figure 11: **Edit Configuration** Window*

When the default settings window (not shown) opens, set the **Media Size** to **Letter** and click on **OK** button to close the dialog window. Then, click on the **Test** button to send a test page to the device. Click on the **OK** button to finish the installation.

3.2.2. KDE Print Manager:

1. To display the KDE Control Center UI, type the following at the command line: # **kcontrol &** and press **Enter**. The **KDE Control Center** window will open.

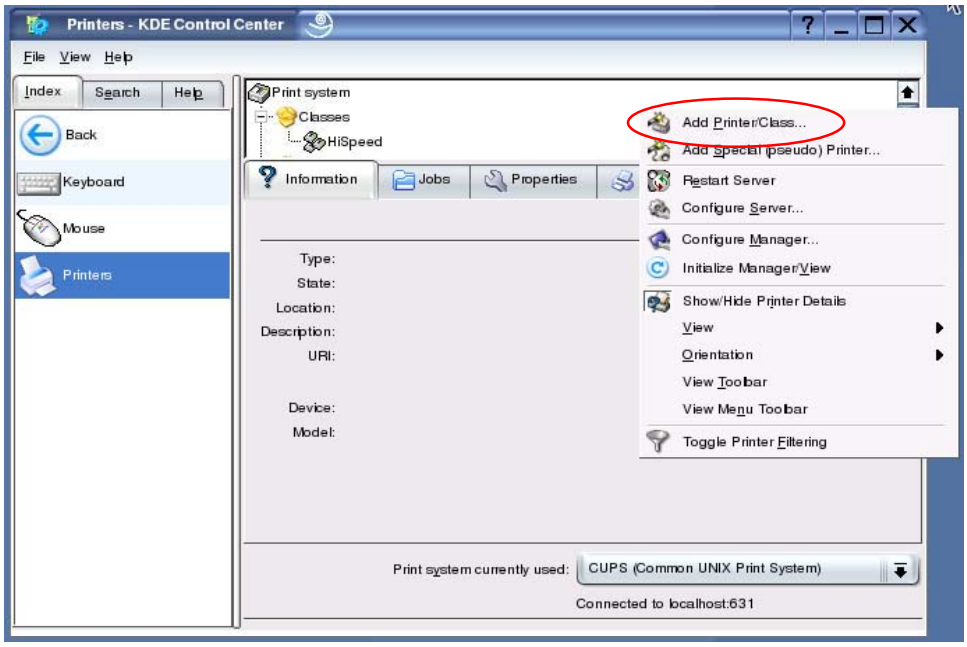

*Figure 12**: KDE Control Center** Window*

On the navigation menu on the left clicking on **Peripherals** will open a menu where **Keyboard**, **Mouse** and **Printers** are available. Click on **Printers**.

To start the installation, right click on upper portion of the main window and select **Add Printer/Class** from the pull down menu. When the Welcome dialog of the **Add Printer Wizard** appears, click on the **Next** button to continue.

2. Select the backend to use. In the example in Figure 13, **Network (TCP)** printing is selected. This setting will be used as an example throughout this section. Click on the **Next** button to continue.

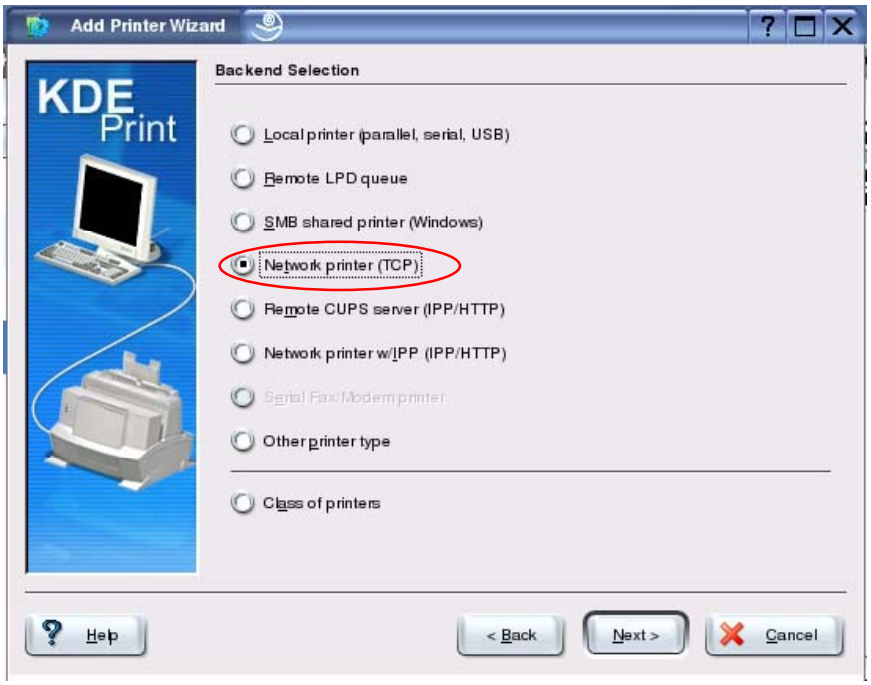

*Figure 13: **Backend Selection** Window*

3. Specify the network printer information in the Network Printer Information window shown below. For **Network (TCP)** printing, enter the printer IP address and port number. Click on the **Next** button to continue.

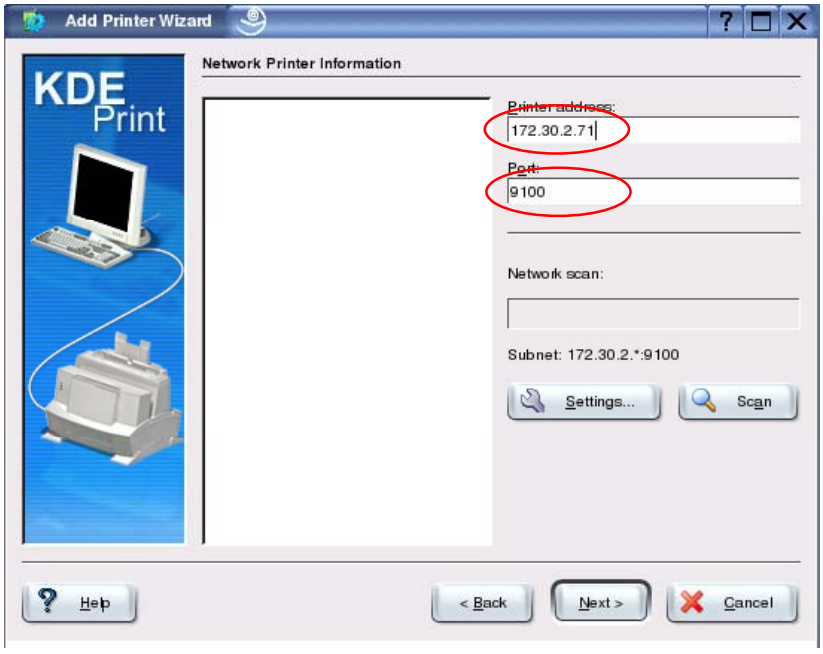

*Figure 14: **Network Printer Information** Window*

4. Select the printer manufacturer and printer model from the list on the **Printer Model Selection** window. Click on the **Next** button to continue.

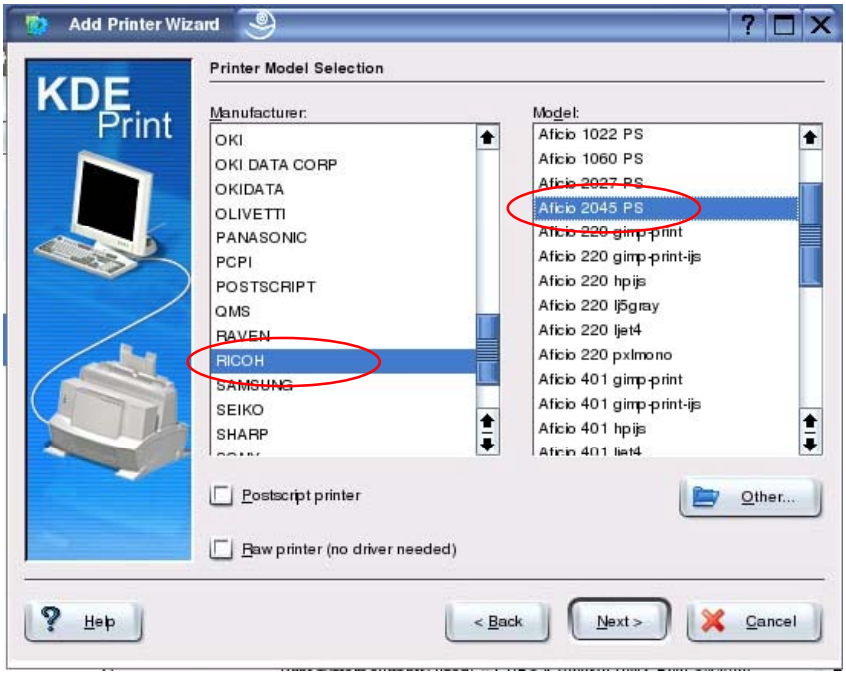

*Figure 15: **Printer Model Selection** Window*

5. Click on the **Settings** button to configure the driver. Set the default **Media Size** to **Letter** and click **OK**. Click on the **Test** button to print a test page. Click on the **Next** button to continue.

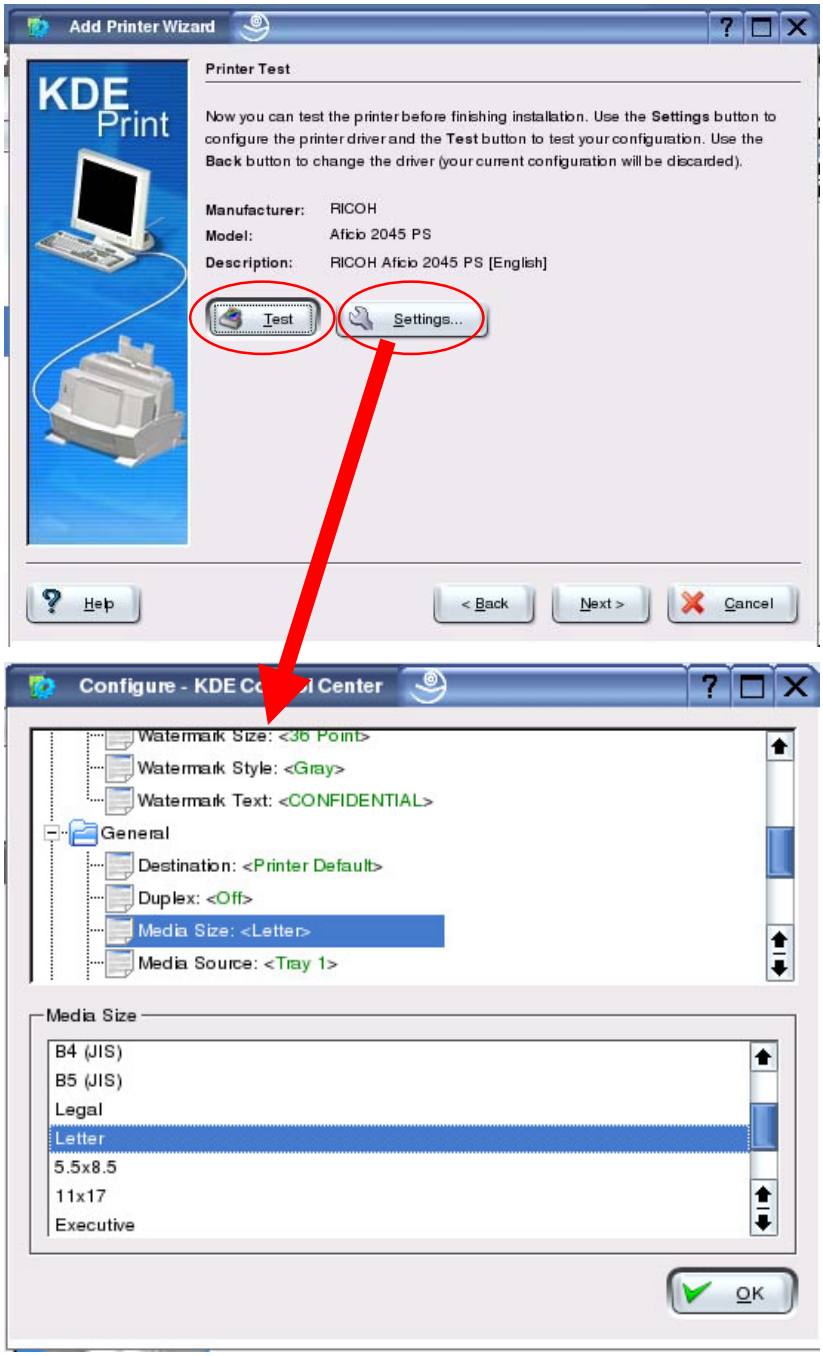

Figure 16: Setting Printer Defaults and Printing a Test Page

6. Continue with installation by skipping the next three screens of the **Add Printer Wizard** until you get to the **General Information** window.

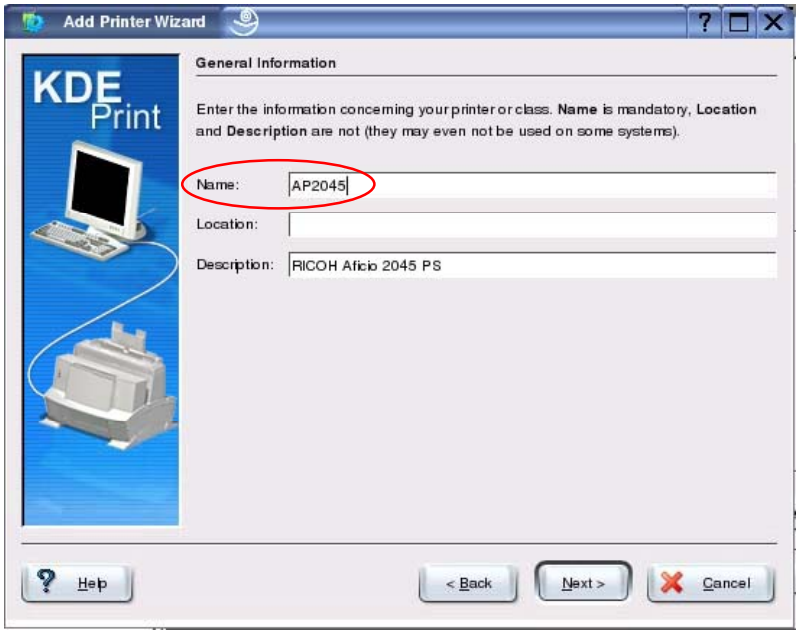

*Figure 17: **Add Printer Wizard, General Information** Window*

Enter the queue name for the newly installed printer. The Location and Description fields are *optional*. Click on the **Next** button to continue.

7. The final screen shows the installation summary. Click on the **Finish** button to complete the installation.

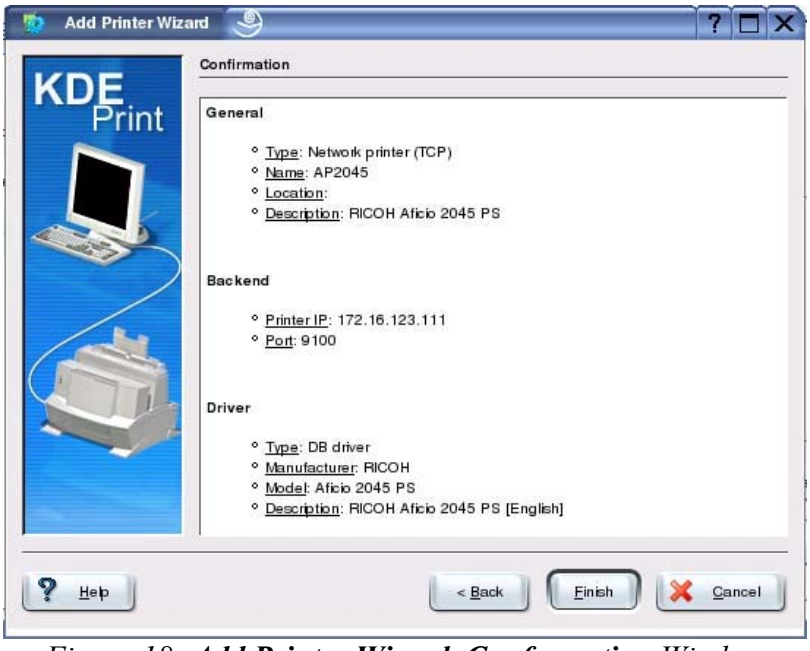

*Figure 18: **Add Printer Wizard, Conformation** Window*

3.2.3. Web Interface:

This section describes how to administer CUPS using the Web Interface. Depending on the authentication setting you might be required to provide a user name and password. CUPS provides two types of authentication: **Basic** and **Digest**. **Basic** authentication uses the UNIX password file while **Digest** maintains a separate file (**/etc/cups/passwd.md5**) to store user accounts. The accounts stored in **/etc/cups/passwd.md5** are created using the **lppasswd** command.

To verify the authentication type, open the CUPS configuration file (**/etc/cups/cupsd.conf**) and locate the AuthType directive under the admin section. If **Basic** authentication is used you can use the current root account and password to authenticate. You should note that not all web browsers support Digest authentication. Refer to the CUPS Administrators Manual in the *References* section for a detailed description on how authentication is implemented.

In the illustration below, the Mozilla web browser is used with **Basic** as the authentication type.

The following are the steps on how to setup a printer using this method:

1. Open a web browser and set the URL address to: **http://localhost:631/admin**

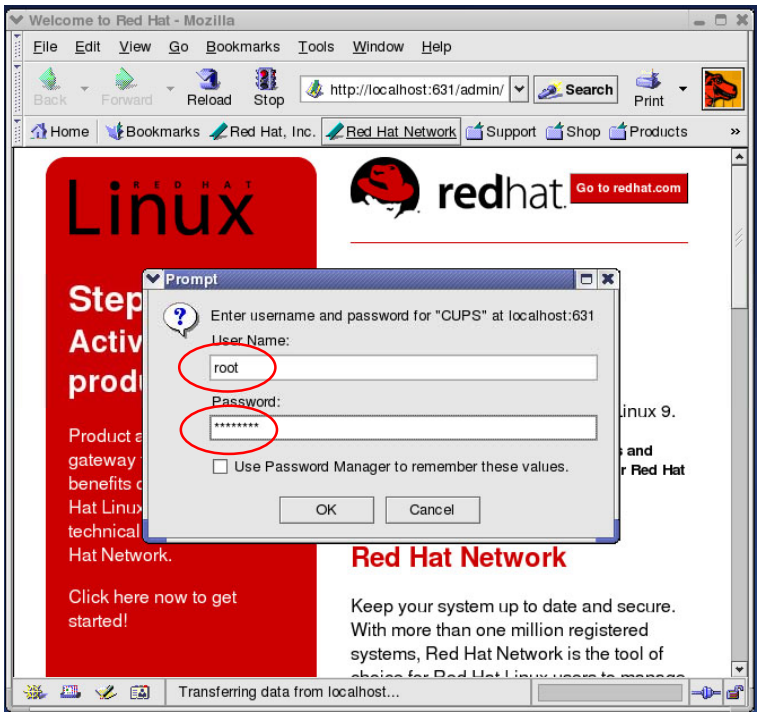

Figure 19: Logging into CUPS via a Web Interface

   Enter the root account name and password. Click on the **OK** button to continue.

2. Once authenticated, the **CUPS Admin** page is displayed. Click on **Add Printer** to continue.

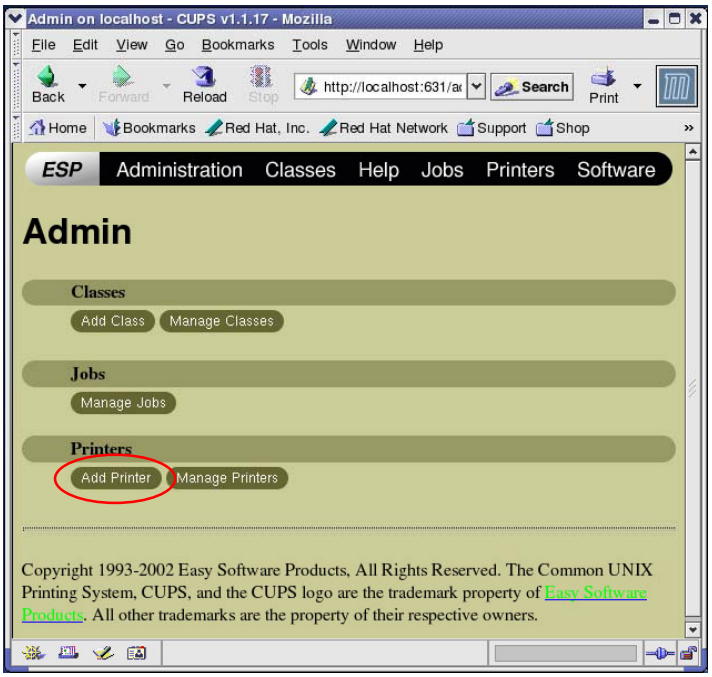

*Figure 20: **CUPS Admin** Page*

3. Enter the printer information.

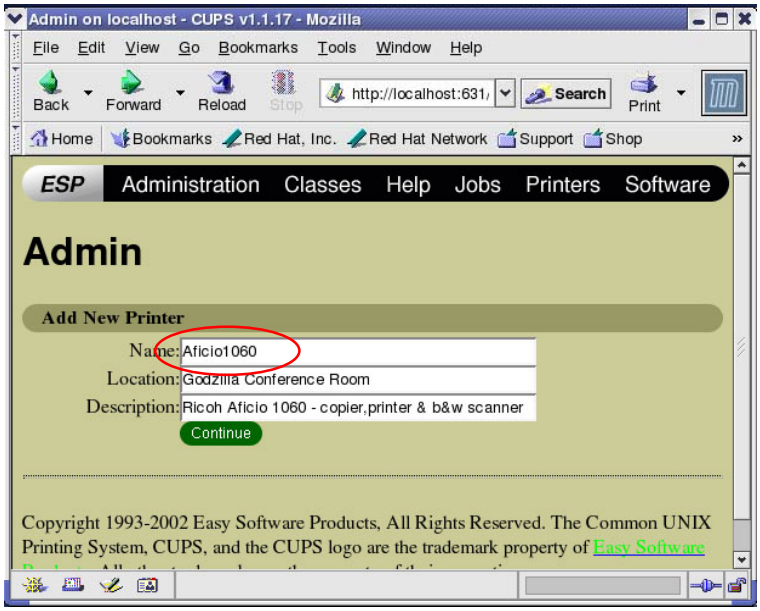

*Figure 21: **CUPS Admin, Add New Printer** Page*

Only the queue **Name** field is required. **Location** and **Description** are optional. Click on **Continue** to proceed.

4. Select the backend or the method on how to communicate with the printer from the **Device** pulldown. In the example below the IPP protocol is selected. Click on **Continue** to proceed.

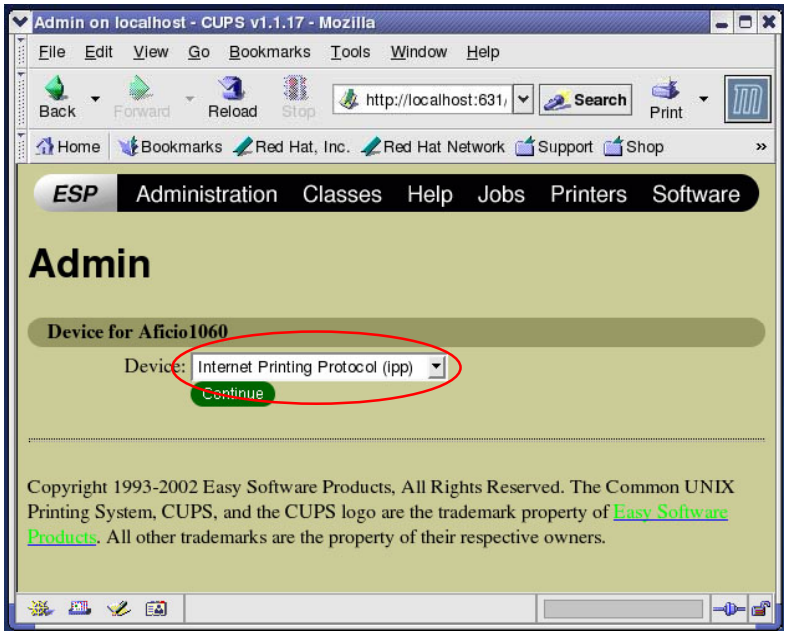

*Figure 22: **CUPS Admin, Device Selection** Page*

5. Enter the backend URI into the **Device URI** field. Click on **Continue** to proceed.

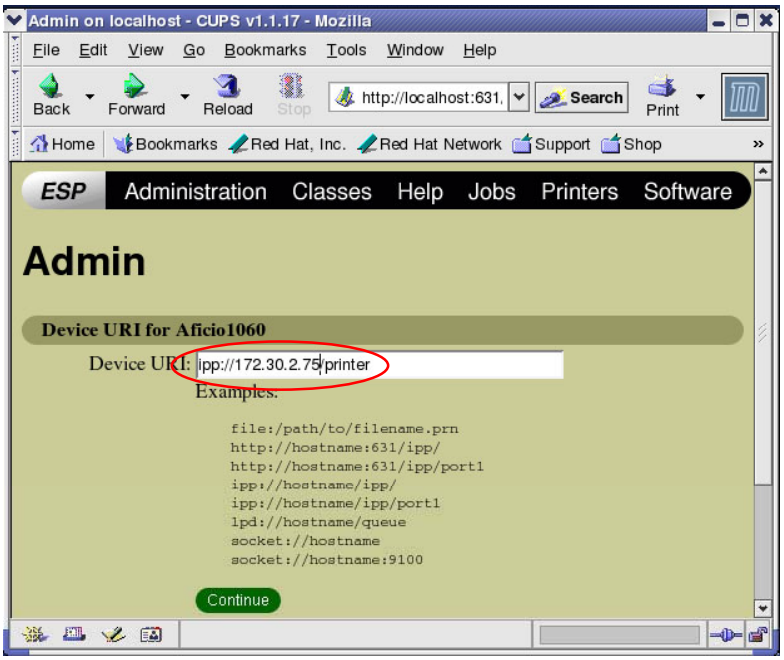

*Figure 23: **CUPS Admin, Device URI** Page*

6. Select the printer manufacturer from the **Make** pull down. Click on **Continue** to proceed.

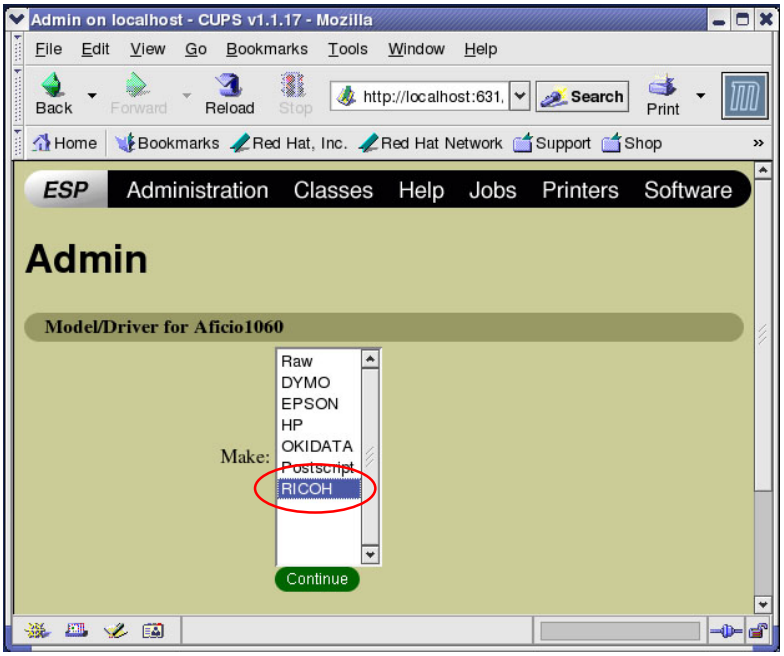

*Figure 24: **CUPS Admin, Make Pull Down** Page*

7. Select the driver.

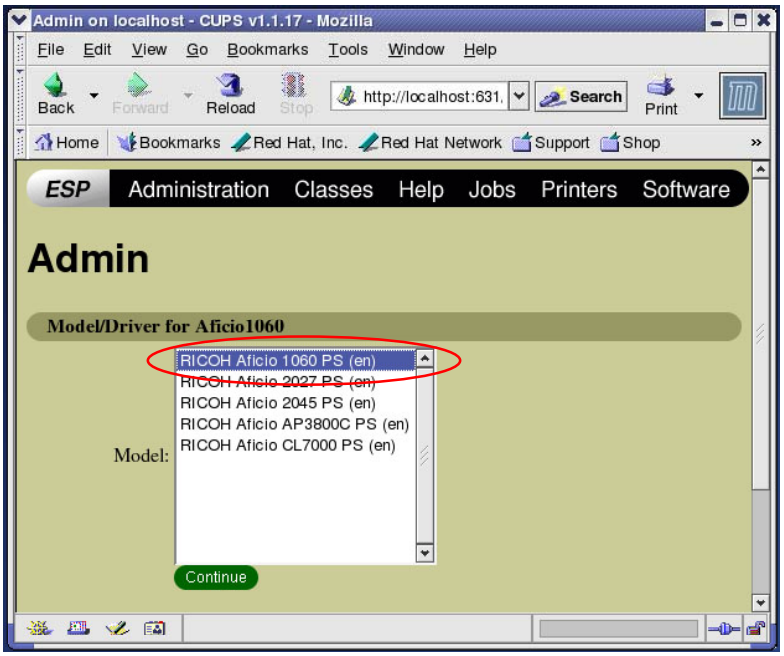

*Figure 25: **CUPS Admin, Model Pull Down** Page*

Click on **Continue** to proceed. At this point you should get a message indicating if the printer is successfully installed. On that same screen click on the newly installed printer name.

8. When the page for the selected printer appears, click on **Configure Printer** to modify the default driver options.

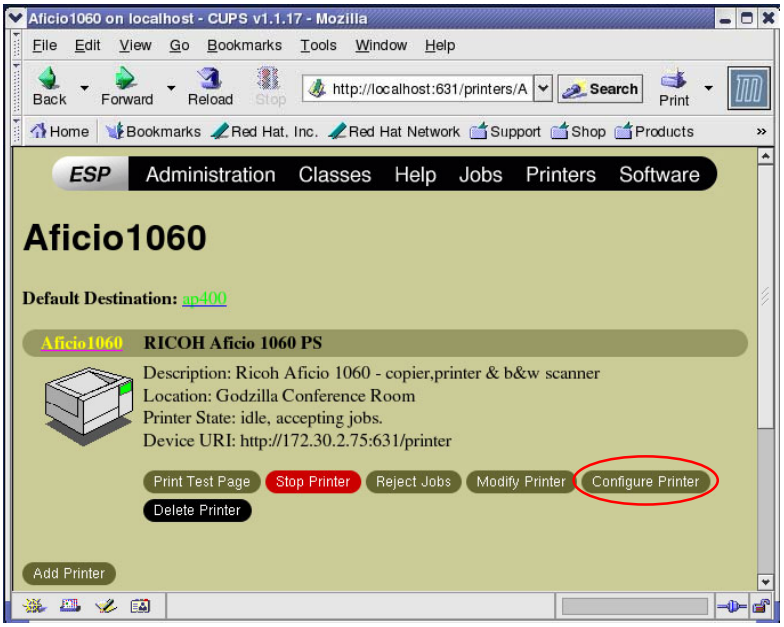

*Figure 26: **CUPS Admin**, Selected Printer Page*

9. On the **CUPS Admin Default Options** page, set the default **Media Size** to **Letter**. Click on **Continue** to proceed.

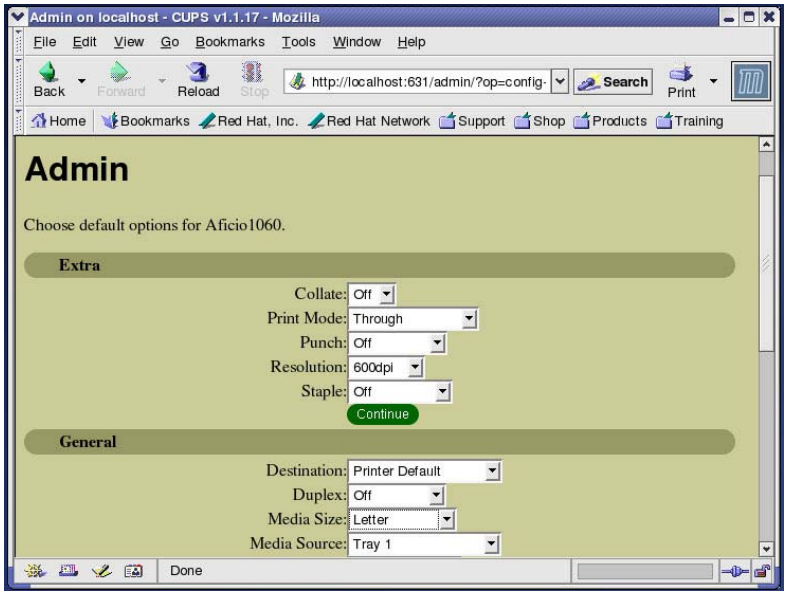

*Figure 27: **CUPS Admin Default Options** Page*

10. Accepting your changes will return you to the Selected Printer Page as shown in Figure 26. **C**lick on **Print Test Page**. Check if test page is successfully printed.

3.2.4. Command Line Interface:

1. To install a printer from the command line , start with the following command:

```
# /usr/sbin/lpadmin -p printer -E -v device -m ppd
```

where:

-p printer	-	queue name
-v device	-	backend URI
-m ppd	-	installed PPD file located in /usr/share/cups/model. The path should be relative to the mentioned directory.
-E	-	enable printer and enable queue to to accept print jobs. If this is not specified the *enable* and *accept* commands should be executed separately.

Example:

```
# lpadmin –p ap3800c –E –v socket://172.30.4.147:9100
        –m Ricoh/Ricoh3800.ppd
```

2. Set the default media size to *Letter* using the lpoptions command:

```
# lpoptions -p printer -o option=[value] …
```

where:

-p printer	-	queue name
-o option=[value]	-	option to set as default

Example:

```
# lpoptions –p ap3800c  -o media=Letter
```

4. Sending Print Jobs

This section shows three different ways of sending a job to the printer using two Graphical User Interface (GUI) tools and the command line interface.

4.1. Kprinter:

Kprinter is a print tool that is part of K Desktop Environment (KDE). Using this tool, you can send print jobs and specify the driver options with the aid of a Graphical User Interface (GUI). It has a similar look and feel to the KDE interface.

1. To launch the tool type the following at the command line: ***# kprinter <filename> &***

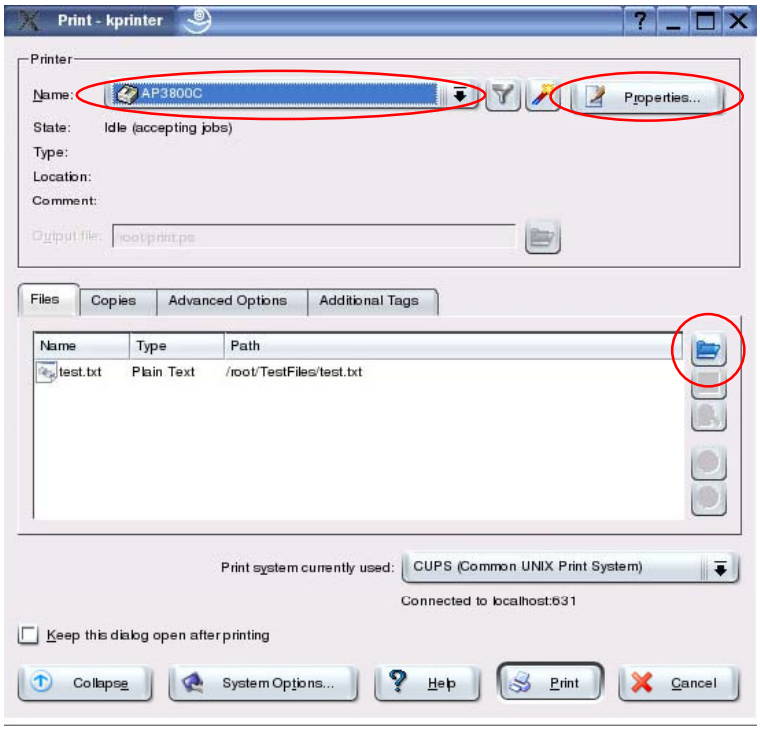

Figure 28: Kprinter Interface

Select the printer or queue name where to send the print job from the dropdown list. To add files, click on the **folder** button and select all the files you want to print.

2. To set the driver options click on the **Properties** button.

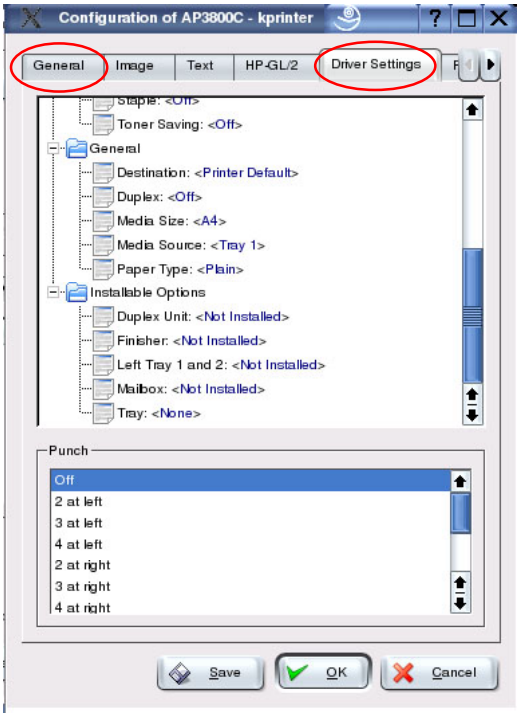

Figure 29: Kprinter Printer Configuration Dialog

Click on the **General** tab to set the basic options. For advanced options click on the **Driver Settings** tab. Click on the **OK** button to apply the settings and return to main screen.

4.2. Gtkprint:

This is another print tool similar to kprinter discussed above. It is based on the GTK graphical interface toolkit.

1. To start the print tool, type the following on the command line : # ***gtklp <filename> &***

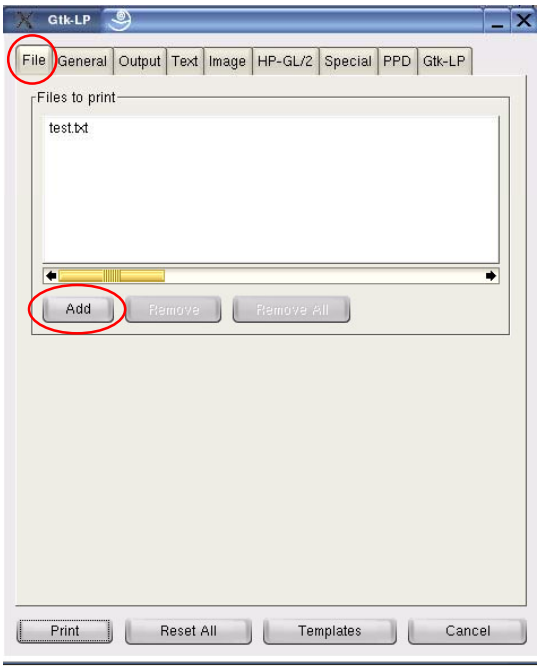

*Figure 30: **GTK Print** Dialog, **File** Tab*

On the **File** tab click the **Add** button to add the files you wish to print.

2. Click on the **General** tab and set the basic options.

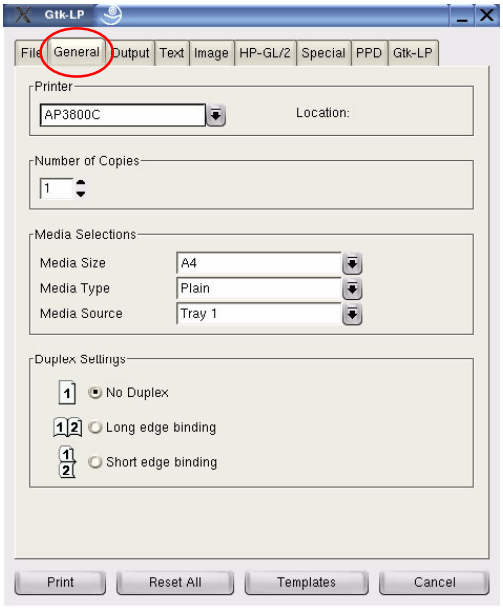

*Figure 31: **GTK Print** Dialog, **General** Tab*

3. Click on the **PPD** tab and set the advanced options.

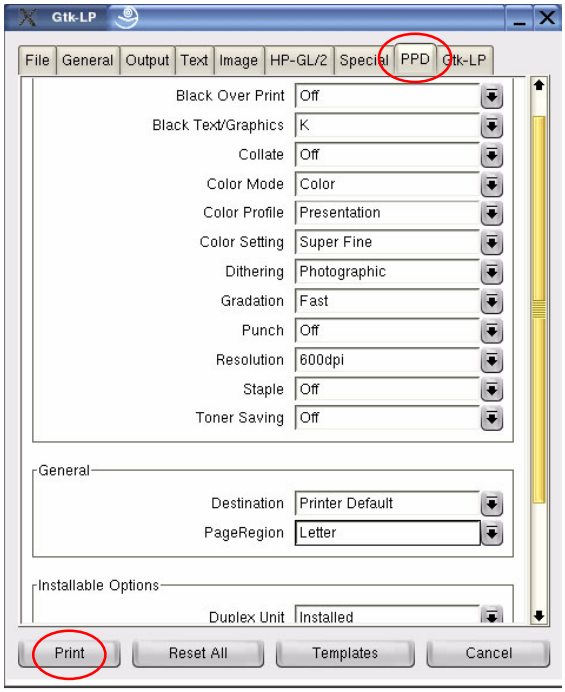

*Figure 32: **GTK Print** Dialog, **PPD** Tab*

4. Click on the **Print** button to send the print job.

4.3. LP/LPR:

On the command line type one of the following commands:

 # lp –d printer –o option=[value] … ***<filename>*** ...

where:

–d printer	-	queue name
–o option=[value]	-	print options

Example:

lp –d AP3800C –o landscape testfile.txt

 # lpr –P printer –o option=[value] … ***<filename>*** ...

where:

–P printer	-	queue name
–o option=[value]	-	print options

Example:

```
lpr –p  AP3800C –o cpi=10
    –osides=two–sided–short–edge  testfile.txt
```

Congratulations, you learned about Ricoh's implementation of the Common Unix Printing System

For a list of print options and other command line utilities refer to the users manual listed in the *References* section.

5. References

1. CUPS: Common Unix Printing System by Michael Sweet
2. CUPS Software Administrators Manual
3. CUPS Software Users Manual
4. CUPS Software Programmers Manual